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EP-A- 0 113 958
EP-A- 0 125 618

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Description

BACKGROUND OF THE INVENTION

This invention relates to composite mats.

Mats of various types have been used to remove soil and moisture from the shoes and feet of pedestrians by providing a brushing or wiping action against the shoes or feet. These mats are generally of two types. One type has a fibrous surface and the other type has a plastic or metallic surface characterized by openings therethrough. Examples of fibrous mats are described in U.S. Patent Nos. 3,837,988 and 4,293,604. Examples of plastic mats having openings therethrough are described in assignee's copending application United States Serial No. 550,641, filed November 10, 1983.

Fibrous mats having loosely packed, coarse fibers effectively remove and retain soil from shoes, but do not remove moisture effectively when they become saturated. Addition of short flock to the fibers of such a mat, as described in U.S. Patent No. 4,293,604, enhances moisture removal but tends to render these mats somewhat more difficult to clean and causes them to show premature wear. Fibrous mats having densely packed, fine fibers, i.e., the so-called carpet-type mats, generally are effective for moisture removal, but solid soil accumulating on the surface thereof produces an undesirable appearance. Plastic mats having openings therethrough generally are not quite as effective in removing soil from shoes as are fibrous mats. Accordingly, it is desirable to produce a floor mat which is effective for both soil removal and moisture removal.

A mat for removing and retaining moisture and particulate matter when walked upon is disclosed in EP-A-113 958.

It comprises a three-dimensionally expanded laminate structure shaped to provide upwardly extending protuberances, the laminate comprising an uppermmost layer and an absorbent substrate layer secured thereto, said laminate structure exhibiting sufficient structural integrity in its uppermost layer to prevent disintegration of the absorbent substrate when twisted and/or used for wiping purposes. The laminate structure is also such that it will not collapse to a completely planar condition when walked upon and will regain its shape again thereafter. The uppermost layer is formed with an aperture at each of the peaks of the protuberances. Fibrous tufts extending from the absorbent substrate project through these apertures. In the valleys between the protuberances the uppermost layer is formed with further apertures to permit moisture to pass downwardly into the absorbent substrate.

In a further prior art, namely EP-A-125 618, there is disclosed a mat comprising a plurality of channel members of metal or hard plastics. These channel members are coupled to each other in a parallel spaced-apart array by U-shaped members having very short upstanding arms that fit into recesses in the bottom of the channel members. In each channel is an elongated strip of bristle material running the length of the channel. This bristle material is spaced from the base of its channel by means of a plate in the channel that is spaced above said base. Thus a mat is produced having spaced apart strips of bristles; the intervening empty spaces between said strips being defined by said U-shaped members, and with said plates serving to provide channels beneath the strips of bristles.

SUMMARY OF THE INVENTION

This invention relates to an improved mat for the removal of soil and moisture from shoes and feet of pedestrians and is as defined in the accompanying Claim 1.

The mat comprises a backing, a foraminous element bonded to said backing, said element having a multiplicity of openings therein, and a multiplicity of bristles having one end bonded to said backing. The bristles are capable of protruding through the openings in the foraminous element to contact the feet or shoes of pedestrians when the element is trod upon by them.

It is preferred that drainage channels are provided in the foraminous element so that moisture descending from the upper surface of the element to the lower surface of the element will have an outlet to minimize the tendency of the mat to become waterlogged.

The mat provides several advantages over conventional floor mats. Because the foraminous element prevents the bristles from being crushed down to the surface of the backing when the mat is tread upon, the mat is more durable than conventional fibrous mats and the soil removal capability of the bristles is enhanced. When drainage channels are incorporated into the foraminous element, removal of moisture from shoes and feet of pedestrians is improved. The presence of bristles also enhances the appearance of the foraminous element. The mat has good durability, good appearance, and excellent soil and moisture removal ability.

BRIEF DESCRIPTION OF DRAWINGS

For convenience in understanding the invention, attention is directed to the accompanying drawings, in which:

FIG. 1 is a greatly enlarged perspective view of a mat of the invention.

FIG. 2 represents a schematic view of a process for producing the mat of the present invention.

FIG. 3 represents a schematic view of a process for producing the foraminous element of the mat of the present invention.

FIG. 4 is an enlarged view of a die used to make the foraminous element of the mat of the present invention.

FIG. 5 is a plan view of a die used to make the foraminous element of a particular embodiment of the mat of this invention.

DETAILED DESCRIPTION

The mat 10 of this invention comprises a foraminous element 11 having a multiplicity of openings 12 formed therein, a backing 13, and bristles 14.

The foraminous element 11 is a three-dimensional layer typically in the form of a sheet or slab and having a multiplicity of openings 12 extending through the entire thickness thereof. As used herein, the thickness of the foraminous element means the straight-line distance between the upper surface of the backing and the upper surface of the foraminous element.

The functions of the foraminous element 11 are to cushion the feet of pedestrians and to act as a barrier between the backing and the ends of the bristles not bonded to the backing so that the bristles are not crushed all the way down to the surface of the backing when the mat is trod upon. The barrier function thus helps to prolong the life of the mat. In addition to the readily apparent function of providing space for the bristles to protrude, the openings in the element 11 also allow moisture to travel downwardly along the bristles so that the upper surface of the element 11 will not be saturated with moisture.

The foraminous element 11 should be formed of material that is water-resistant, wear-resistant, and structurally stable. Preferably, the material should also be flexible, resilient, and conformable to surfaces upon which it is placed. One class of materials possessing the foregoing characteristics is organic polymers. The preferred organic polymeric materials for forming the three-dimensional layer include polyvinyl chlorides, polyesters, e.g. polyethylene terephthalate, and polyurethanes. The most preferred material is polyvinyl chloride. Various rubber materials can also be used.

The foraminous element 11 can be formed from cast sheet material having openings 12 formed through the thickness thereof. The openings 12 can be provided by means of the mold from which the cast sheet is formed, or they can be provided by cutting out sheet material by means of a die. The element 11 is preferably formed from ribbon-like strips 15 which are undulated and connected on their major surfaces to like undulated strips or to straight, elongated strips 16. Fig. 1 shows openings 12 bounded by undulated strips 15 and straight, elongated strips 16. The area of the upper surface of the foraminous element 11 preferably comprises at least 40% openings and less than 60% solid material, so that a sufficient number of bristles can protrude through the element 11 so as to be available for contact with shoes and feet. However, the element 11 must have sufficient solid material of sufficient strength and in appropriate structural configuration to avoid being permanently deformed by the force applied by persons standing thereon. Accordingly, the element 11 should be able to withstand a force of a large person, e.g. at least about 250 lbs. The openings 12 must be of such dimensions and configuration that the bristles will extend therethrough to contact feet and shoes when the mat is trod upon.

The foraminous element 11 is preferably at least about 5 mm thick, more preferably 10 to 25 mm thick and the openings 12 are at least about 2 mm, preferably about 3 to 20 mm in average diameter or average width. The shape of the openings 12 can vary. For example, they can be circular, elliptical, polygonal, or irregular. As shown in Fig. 1, the openings 12 in the element 11 are the shape of bell-shaped curves.

The backing 13 provides support and anchorage for the foraminous element and the bristles, and provides the major surface which contacts the floor. The backing also helps the mat lie flat and not move when subjected to pedestrian traffic. Like the material of the foraminous element, the material of backing 13 should be water-resistant, wear-resistant, and structurally stable and preferably flexible and conformable to surfaces upon which it is placed. The backing 13 is preferably formed from an organic polymeric material. It is preferred that the backing 13 be prepared in situ at the same time that a preformed foraminous element and the bristles are bonded thereto. When the backing 13 is prepared in situ, the viscosity of the curable liquid-state polymeric material from which it is formed should be such as to permit penetration by and

wetting of the bristles to insure firm bonding thereof. The backing 13 is preferably formed from a filled polyvinyl chloride plastisol into which the preformed foraminous element and bristles are placed. It is also preferred that the backing 13 be a continuous sheet material because a discontinuous material would allow soil and moisture to accumulate under the mat, which could possibly lead, over time, to deterioration of the covered area. The continuous material may be solid, an open cell foam, a closed cell foam, or combination thereof. The thickness of the backing 13 can vary. A typical thickness range is from about 1 to about 5 mm.

The functions of the bristles 14 are to aid in removing soil and moisture from the shoes of pedestrians and to enhance the appearance of the foraminous element.

The bristles 14 are preferably straight fibers and they can have a length less than, equal to, or greater than the thickness of the foraminous element 11. The bristles must be of such a length that they will protrude through the openings 12 of element 11 to contact feet and shoes when the mat is trod upon. The bristles are generally substantially erect when they are contacting feet and shoes so that they can effectively remove moisture and soil therefrom If the bristles have a length greater than the thickness of layer 11, it is preferred that they extend no more than about 10 mm beyond the upper surface of the foraminous element 11. Extension of a greater distance will probably result in reduced durability of the bristles. Bristles having a length less than the thickness of element 11 are less likely to be pulled out of the backing by foot motion of pedestrians. However, bristles having a length greater than the thickness of element 11 provide better soil and moisture removal capabilities and improve the appearance of the mat. Accordingly, bristles having a length approximately equal to the thickness of element 11 may be preferred because they provide good soil and moisture removal capability and little likelihood of being pulled out of the backing under normal conditions of use. The bristles are made from water-resistant and wear-resistant material, preferably nylon, polyester, acrylic, rayon, or polypropylene fiber. The diameter of the bristles 14 can vary, and preferably correspond to from about 6 to about 350 denier. When the bristles 14 are formed from individual fibers, the preferred bristle diameter range corresponds to from about 40 to about 350 denier. The bristles 14 can also be formed from slasher flock, which is a plurality of fibers, e.g., 100 to 200 ends, that are bonded together with a soluble binder which is removed after the fibers are bonded to the backing. When the bristles 14 are formed from slasher flock, the preferred bristle diameter range corresponds to from about 5 to about 50 denier.

A plurality of channels 17 for drainage of moisture are located adjacent the lower surface of the foraminous element 11. These channels allow moisture to drain away from the sides of the mat.

The mat 10 of the invention can be produced by following the process which is schematically depicted in Fig. 2. Foraminous element 11 is drawn from a storage roll 20 and then laid into a layer 25 of curable polymer in the liquid state which has been coated onto carrier belt 26 by knife coater 27. When cured, the polymeric material of layer 25 will form the backing 13. At flock coating station 28 the element 11 is coated with bristles 14, which are then caused to penetrate into the openings 12 of element 11 and further penetrate into the liquid material of layer 25.

The bristles 14 may be applied using conventional flock coaters which use mechanical motion to disperse and cause the bristles 14 to pass through the openings 12 of the element 11. The devices are commercially available and a representative example thereof is an "Indev" 650 mm wide flock machine. Excess bristles 14 deposited at coating station 25 may be removed by vacuuming.

After the composite mat material leaves the flock coating station, the polymeric material of layer 25 is cured to form backing 13 and to simultaneously bond the thus-formed backing 13 to the foraminous element 11 and bristles 14. Preferably, the curing step is conducted in an oven 29 under conditions conventionally employed to cure the polymeric material of layer 25.

If the bristles 14 used in the invention are slasher flock, it is desirable to lightly wash the bristle surface of the cured composite mat with water or other agents to remove the temporary binder which holds the filaments of the slasher flock together.

The resultant composite mat can be rolled to provide a bulk roll 30 for future conversion to smaller sizes. Alternatively, the composite mat can be cut into shorter segments for immediate use instead of being formed into a roll.

A method of making the preferred embodiment of the foraminous element 11 is given in assignee's copending patent application U.S Serial No. 550,641, filed November 10, 1983, and incorporated herein by reference.

As shown in FIG. 3 a filament forming, extrudable plastic mass is extruded by extruder 40 (where the extruded substance may be rendered plastic) from extruder die 41 which has the appropriate extruder orifices 42 to form substantially continuous extruded web 43. As shown in FIG. 3 the extruded web may be fed into quench bath 44 containing a suitable quenching medium such as water and guided therein by idler roll sets 45 and 46 and removed therefrom by passing between idler roll set 47 after which it can be wound

for storage or incorporated directly into a product.

FIG. 4 depicts a typical extruder die, having three slot-like openings and being tapered on the inlet side around each opening. A central opening 50 is a wider slot than outer openings 51a and 51b. Wider center opening 50 is spaced within narrower openings 51a and 51b to produce a velocity of flow of the filament-forming extrudable plastic mass so that the ribbon-like strip extruded from center opening 50 flows faster than the straight, elongated strip extruded through openings 51a and 51b. Appropriate spacing of openings, contact between the central extruded strip emitting from opening 50 and an adjacent strip (e.g., the strip extruded from opening 51a) and then the strip extruded from the other adjacent opening produces a regular folded structure. The faster moving center strip extruded from the opening 50 tends to fold back and forth or oscillate between slower moving strips extruded from openings 51a and 51b.

The faster moving center strip at some point after exiting the die will attach itself to one of the outer strips. The attachment by necessity retards the flow of the center strip and causes a buckling or bunching of the central strip, causing it to bend toward the other slower moving outer strip. This motion repeats itself in a regular oscillatory fashion. The difference in velocity between the extruded strips results in the central strip bending back and forward in a regular manner and frequency. In the case of typical thermoplastic materials, a contact bond is formed when the two tacky surfaces touch each other sequentially during the process, and, by quenching the tacky material in an appropriate manner, the thermoplastic material is frozen in this zig-zag structure.

Preferably, outer openings 51a and 51b are of greater length than central opening 50 so that the strips emerging from outer openings 51a and 51b will be wider than the strip emerging from the central opening 50. Alternatively, outer openings 51a and 51b can be of lesser length than central opening 50 so that strips emerging from openings 51a and 51b will be narrower than the strip emerging from opening 50. The resulting difference in width between connected strips defines the vertical length of the drainage channels 17 of the composite mat. The drainage channels 17 can be beneath either the undulated strips or the straight strips.

Typical aspect ratio values, i.e., length to width of the extruded strip, for articles produced according to the decribed method fall in the range of about 2:1 to 12:1.

It is possible to interconnect a series of such strips by employing, for example, a die of the type depicted in FIG. 5 to produce a layer of the type depicted in FIG. 1. The die, of course, would have appropriate openings 61, 62 sufficient in number to produce an element 11 of desired surface dimensions.

Various modifications of extruded structures depend substantially upon the extrusion slot dimensions and the means by which differential flow is achieved. The process requires that the undulatable strip be extruded faster than the straight strips. This may be accomplished, for example, by modification of the dimensions of the extrusion orifices, the extrusion die (for example, by variation of the path length within the die) or by employing a multi manifold die with independent flow control for the undulatable strip and for the straight strip. The first method, that utilizing different orifice sizes to achieve differential flow, is the simplest and preferred method. Optionally, the layer made according to the teaching of United States Serial No. 550,641 may be lightly coated with a binder to provide reinforcement therefor.

Bristles and material for forming the backing are commercially available.

The following non-limiting examples will further illustrate the invention. All percentages are percent by weight unless otherwise indicated.

EXAMPLE 1

A foraminous element was prepared by extruding a plasticized polyvinyl chloride containing 57.1% of a medium molecular weight vinyl chloride polymer and 42.9% monomeric phthalate plasticizer together with small amounts of stabilizers and other modifiers through a die similar to that shown in FIG. 5. The mixture was extruded at a pressure of about 6.9×10^6 Pa through a die having the following dimensions:

Slot width (major)	0.76 mm
Slot length (major)	2.03 mm
Slot width (minor)	0.56 mm
Slot length (minor)	6.30 mm
Slot spacing	3.05 mm
Number of major slots	29
Number of minor slots	30

Slot position of major slot offset 0.25 mm in from edge of minor slot

The die was heated to about 175° C and positioned about 10 mm above the surface of a 660 mm wide, 915 mm long, 355 mm deep water quench bath which was being flushed with 15° C to 20° C water at the rate of 7.5 x 10^{-5} m^3/sec. Two horizontally opposed rolls 125 mm in diameter and 560 mm long having a gap to permit the extruded element to pass through without compression guided the element in the quench bath. A second set of horizontally opposed rolls, 65 mm in diameter, positioned 152 mm on centers immediately below the first set of rolls guided the quenched element out of the bath. The formed element was then dried in preparation for the next step. The extruded element weighed 2.2 kg/m^2 and was 6.4 mm thick. The element was then coated on its upper major surface with a liquid polyvinyl chloride plastisol using a two-roll coater having a metered amount of the liquid plastisol applied from a doctor blade to the top roll. The liquid plastisol was composed of 54.5% dispersion grade polyvinyl chloride resin, 40.9% mixed dialkyl phthalate plasticizer, together with small amounts of stabilizers and other additives. After the element had been coated, compressed air was blown onto it to insure that the plastisol coating would not block the openings which run through the layer. Plastisol coating weight was 0.084 kg/m^2. The coated layer was cured at 160° C for 10 minutes.

The thus-formed foraminous element was then placed into a conventional polyvinyl chloride plastisol composition containing 26.2% of a medium molecular weight vinyl chloride polymer, 31.4% mixed ester phthalate plasticizer, and 42% calcium carbonate filler, together with small amounts of stabilizers, colorants, and other additives. After mixing, the polyvinyl chloride plastisol mixture was uniformly coated with a doctor blade coater to a wet thickness of 1.1 mm over a width of 200 mm onto a releasable surface. The three-dimensional layer was then placed into the liquid plastisol. Nylon-6,6 bristle fibers which were 100 denier in fineness and 8 mm to 10 mm long were coated onto the upper horizontal surface of the foraminous element by means of an "Indev" 650 mm wide flock machine. The bristle fibers were placed in feed hoppers from which the fibers were fed with the aid of brushes onto and through screens having 6 mm diameter openings and permitted to fall onto the surface of the foraminous element. Beater bars turning at about 150 rpm contacted the backside of the releasable surface web causing the bristle fibers to become vertically orientated, penetrate the openings of the foraminous element, and become lodged in the liquid plastisol. About 0.55 kg/m^2 of bristles were retained in a nearly uniform distribution. After being subjected to cure conditions of 160° C for 10 minutes, the plastisol backing was solidified and the bristles and foraminous element were bonded thereto.

The resulting mat material weighed about 3.15 kg/m^2 and was about 10 mm thick. The bristles protruded through the foraminous element and extended up to 5 mm beyond the upper surface of the layer. The mat material was cut and seamed into mats. The resultant mats were effective in removing soil and moisture from pedestrians' shoes.

EXAMPLE 2

A mat was made in the same manner as described in Example 1 with exception that 45 denier, 9.5 mm long nylon-6,6 bristles were employed to yield bristle coating weight of 0.29 kg/m^2. The resultant mat was effective in removal of soil and moisture from pedestrians' shoes.

EXAMPLE 3

A preformed 85 mm square piece of a plasticized polyvinyl chloride foraminous element having

openings 5 mm square, 6.35 mm deep, and wall thickness between openings of 0.79 mm was laid into plastisol layer having a depth of aout 2 mm. Then 45 denier, 6.4 mm long nylon-6,6 bristles were applied to the surface of the foraminous element, and the structure was subjected to vibratory action by vigorously tapping the container holding the sample, thus causing the bristles to penetrate the openings of the foraminous element and become lodged in the plastisol layer. After being subjected to cure conditions of 160° C for 10 minutes, the plastisol backing was solidified, and the bristles and foraminous element were bonded thereto. The resultant mat segment was effective in removal of soil and moisture from pedestrians' shoes.

EXAMPLE 4

A foraminous element was prepared similar to that prepared in Example 1 with exception that the die used had the following dimensions:

Slot width (major)	1.27 mm
Slot length (major)	7.92 mm
Slot width (minor)	0.91 mm
Slot length (minor)	7.92 mm
Slot spacing	7.37 mm
Number of major slots	12
Number of minor slots	13

The resultant element, which was about 15 mm thick, was placed into a liquid plastisol backing material as in Example 1. Polyethylene terephthalate bristles which were 330 denier and 15 mm long were caused to penetrate the openings in the foraminous element and to become lodged in the liquid plastisol. After being subjected to cure conditions of 160° C for 10 minute, the plastisol backing was solidified and the bristles and foraminous element were bonded thereto. The resultant mat contained 0.65 kg/m^2 bristles and had a thickness of about 17 mm. The mat was effective in removing soil and moisture from pedestrians' shoes.

EXAMPLE 5

A mat was made in the same manner as described in Example 1 with the exception that slasher flock comprising 192 filaments of polyethylene terephthalate bristles which were 6 denier and 12.2 mm long, was used instead of the 100 denier nylon bristles. After the liquid plastisol had been cured, the composite mat material was washed with water to remove the temporary binder from the slasher flock. The resultant mat material contained 0.55 kg/m^2 slasher flock. The mats prepared with slasher flock were water absorbent, removed soil from the shoes of pedestrians, and had a luxurious appearance.

It should be understood that this invention is not to be unduly limited to the illustrative embodiments set forth herein.

Claims

1. A mat for removing soil and moisture from shoes and feet comprising:

a water-resistant, wear-resistant foraminous element (11) defining a plurality of upwardly directed openings (12);

a backing (13) bonded to said water-resistant, wear-resistant foraminous element;

a multiplicity of upstanding water resistant wear resistant bristles (14) having one end bonded to said backing, said bristles being capable of protruding through said openings to contact shoes and feet when said foraminous element is trod upon by pedestrians;
characterized in that

said backing (13) is of water resistant and wear resistant material;

said foraminous element (11) comprises upstanding strips (16) and undulated strips (15) interconnecting said upstanding strips on their major surfaces to define therewith said plurality of upwardly directed openings (12);

said upstanding strips (16) or said undulated strips (15) being spaced from the backing (13) to define drainage channels between the foraminous element (11) and the backing (13).

2. A mat as claimed in Claim 1 wherein the upstanding strips (16) are straight elongated strips and the further strips (15) are undulated and connected on their major surfaces to the straight strips to define said openings (12).

3. A mat as claimed in Claim 1 wherein the upstanding strips (16) are undulated and the further strips (15) are also undulated, the upstanding strips and further strips being connected to each other on their major surfaces to define said openings (12).

4. A mat as claimed in Claim 2 wherein said straight strips (16) are bonded to said backing (13) and said undulated strips (15) are spaced from said backing so as to form said drainage channels (17) beneath said undulated strips (15).

5. A mat as claimed in Claim 2 wherein said undulated strips (15) are bonded to said backing (13) and said straight strips (16) are spaced from said backing (13) so as to form drainage channels (17) beneath the straight strips.

6. A mat as claimed in Claim 1 and wherein said foraminous element (11) with its upwardly directed openings (12) is formed as a cast sheet.

7. A mat as claimed in any of Claims 1 to 6 and wherein the area of the upper surface of said foraminous element comprises at least about 40% openings and less than 60% solid material.

8. A mat as claimed in any of Claims 1 to 7 and wherein said bristles (14) are formed from slasher flock.

9. A mat as claimed in any of Claims 1 to 8 and wherein said backing (13) is formed from an organic polymeric material.

10. A mat as claimed in any of Claims 1 to 9 and wherein said foraminous element (11) is formed from an organic polymeric material.

11. A mat as claimed in any of Claims 1 to 10 and wherein said backing (13) is formed of continuous material.

12. A mat as claimed in any of Claims 1 to 11 in which the foraminous element (11) is flexible and resilient such that the upper surface thereof, where walked upon, is capable of downward deflection relative to the backing (13).

13. A mat as claimed in Claim 12 and wherein the bristles (14) are of a length less than the thickness of the foraminous element (11) and the flexibility and resiliency of the foraminous element are such that in use, those areas of the mat that are walked upon will deflect resiliently downwardly to an extent permitting the bristles (14) to contact the shoes or feet of the walker.

Revendications

1. Paillasson destiné à enlever les saletés et l'humidité des chaussures et des pieds, comprenant : un élément ajouré (11) qui résiste à l'eau et à l'usure, en présentant une série d'ouvertures (12) orientées vers le haut; un support (13) lié à cet élément ajouré qui résiste à l'eau et à l'usure; une multiplicité de soies dressées (14) qui résistent à l'eau et à l'usure et dont une extrémité est liée au support susdit, ces soies pouvant se présenter en saillie à travers les ouvertures précitées pour entrer en contact avec

les souliers et les pieds lorsque des piétons marchent sur cet élément ajouré, caractérisé en ce que le support (13) est fait d'une matière qui résiste à l'eau et à l'usure, et en ce que l'élément ajouré (11) comprend des bandes dressées (16) et des bandes ondulées (15) reliant entre elles les bandes dressées susdites suivant leurs surfaces principales pour former avec elles la série susdite d'ouvertures orientées vers le haut (12), les bandes dressées (16) ou les bandes ondulées (15) étant espacées du support (13) pour former des canaux de drainage entre l'élément ajouré (11) et le support (13).

2. Paillasson suivant la revendication 1, caractérisé en ce que les bandes dressées (16) sont de longues bandes droites, et en ce que les autres bandes (15) sont ondulées et reliées suivant leurs surfaces principales aux bandes droites pour créer les ouvertures susdites (12).

3. Paillasson suivant la revendication 1, caractérisé en ce que les bandes dressées (16) sont ondulées et en ce que les autres bandes (15) sont ondulées également, les bandes dressées et les autres bandes étant reliées les unes aux autres suivant leurs surfaces principales pour former les ouvertures susdites (12).

4. Paillasson suivant la revendication 2, caractérisé en ce que les bandes droites (16) sont liées au support (15), et en ce que les bandes ondulées (15) sont espacées de ce support de manière à former les canaux de drainage (17) en dessous des bandes ondulées (15).

5. Paillasson suivant la revendication 2, caractérisé en ce que les bandes ondulées (15) sont liées au support (13), et en ce que les bandes droites (16) sont espacées de ce support (13) pour former des canaux de drainage (17) en dessous des bandes droites.

6. Paillasson suivant la revendication 1, caractérisé en ce que l'élément ajouré (11) comportant des ouvertures (12) orientées vers le haut est fabriqué sous forme d'une feuille coulée.

7. Paillasson suivant l'une quelconque des revendications 1 à 6, caractérisé en ce que l'aire de la surface supérieure de l'élément ajouré comprend au moins environ 40 % d'ouvertures et moins de 60 % de matière solide.

8. Paillasson suivant l'une quelconque des revendications 1 à 7, caractérisé en ce que les soies (14) sont formées d'un floc encollé.

9. Paillasson suivant l'une quelconque des revendications 1 à 8, caractérisé en ce que le support (13) est formé au départ d'une matière polymère organique.

10. Paillasson suivant l'une quelconque des revendications 1 à 9, caractérisé en ce que l'élément ajouré (11) est formé au départ d'une matière polymère organique.

11. Paillasson suivant l'une quelconque des revendications 1 à 10, caractérisé en ce que le support (13) est formé d'une matière continue.

12. Paillasson suivant l'une quelconque des revendications 1 à 11, caractérisé en ce que l'élément ajouré (11) est souple et élastique, de sorte que sa surface supérieure, lorsqu'on marche sur ce paillasson, est capable d'une déviation descendante par rapport au support (13).

13. Paillasson suivant la revendication 12, caractérisé en ce que les soies (14) sont d'une longueur inférieure à l'épaisseur de l'élément ajouré (11), et en ce que la souplesse et l'élasticité de cet élément ajouré sont telles que, lors de l'utilisation, les aires du paillasson sur lesquelles on marche se déformeront de manière élastique vers le bas jusqu'à un degré permettant aux soies (14) d'entrer en contact avec les chaussures ou les pieds du passant.

Patentansprüche

1. Matte zum Entfernen von Schmutz und Feuchtigkeit von Schuhen und Füßen mit

einem wasserfesten und verschleißfesten durchlöcherten Element (11), das eine Mehrzahl von

aufwärtsgerichteten Öffnungen (12) begrenzt;

einem mit dem wasserfesten und verschleißfesten durchlöcherten Element stoffschlüssig verbundenen Rücken (13); und

einer Vielzahl von aufwärtsgerichteten, wasserfesten und verschleißfesten Borsten (14), die am einen Ende mit dem Rücken stoffschlüssig verbunden sind und die geeignet sind, durch die genannten Öffnungen hindurch vorzuragen und Schuhe und Füße zu berühren, mit denen Fußgänger auf das durchlöcherte Element treten;

dadurch gekennzeichnet, daß

der Rücken (13) aus einem wasserfesten und verschleißfesten Werkstoff besteht;

das durchlöcherte Element (11) hochkant angeordnete Bänder (16) und gewellte Bänder (15) besitzt, die die hochkant angeordneten Bänder auf ihren Breitseitenflächen miteinander verbinden und mit ihnen die Mehrzahl von aufwärtsgerichteten Öffnungen (12) begrenzen; und

die hochkant angeordneten Bänder (16) oder die gewellten Bänder (15) im Abstand von dem Rücken (13) angeordnet sind und zwischen dem durchlöcherten Element (11) und dem Rücken (13) angeordnete Kanäle begrenzen.

2. Matte nach Anspruch 1, dadurch gekennzeichnet, daß die hochkant angeordneten Bänder (16) gerade langgestreckte Bänder sind und daß die zusätzlich vorgesehenen Bänder (15) gewellt sind und auf ihren Breitseitenflächen unter Begrenzung der genannten Öffnungen (12) mit den geraden Bändern zusammenwirken.

3. Matte nach Anspruch 1, dadurch gekennzeichnet, daß die hochkant angeordneten Bänder (16) gewellt sind, daß die zusätzlich vorgesehenen Bänder (15) ebenfalls gewellt sind und daß die hochkant angeordneten Bänder und die zusätzlich vorgesehenen Bänder auf ihren Breitseitenflächen unter Begrenzung der Öffnungen (12) miteinander verbunden sind.

4. Matte nach Anspruch 2, dadurch gekennzeichnet, daß die hochkant angeordneten Bänder (16) mit dem Rücken (13) stoffschlüssig verbunden sind und daß die gewellten Bänder (15) unter Bildung der unter den gewellten Bändern (15) angeordneten Ablaufkanäle (17) im Abstand von dem Rücken angeordnet sind.

5. Matte nach Anspruch 2, dadurch gekennzeichnet, daß die gewellten Bänder mit dem Rücken (13) stoffschlüssig verbunden sind und daß die geraden Bänder unter Bildung der unter den geraden Bändern angeordneten Ablaufkanäle (17) im Abstand von dem Rücken (13) angeordnet sind.

6. Matte nach Anspruch 1, dadurch gekennzeichnet, daß das durchlöcherte Element (11) mit seinen aufwärtsgerichteten Öffnungen (12) als gegossenes Blatt hergestellt ist.

7. Matte nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß die obere Fläche des durchlöcherten Elements zu mindestens etwa 40 % aus Öffnungen und zu weniger als 60 % aus festem Werkstoff besteht.

8. Matte nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß die Borsten (14) aus Kettschlichterflock bestehen.

9. Matte nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, daß der Rücken (13) aus einem organischen polymeren Werkstoff besteht.

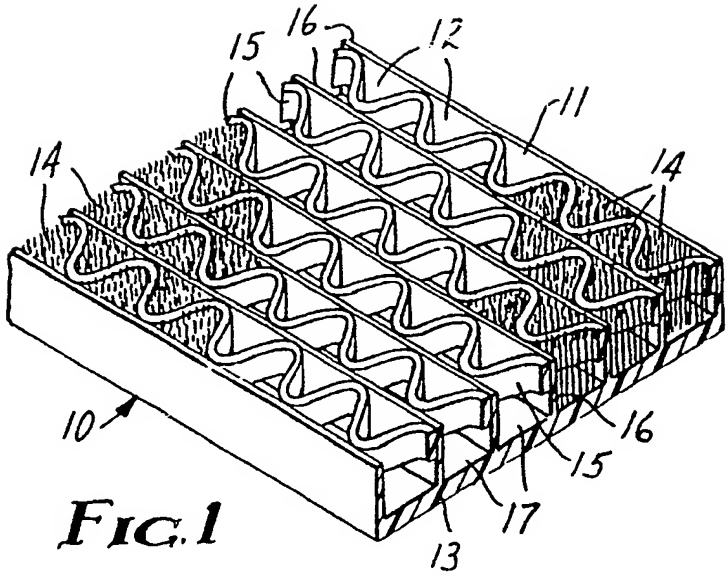
10. Matte nach einem der Ansprüche 1 bis 9, dadurch gekennzeichnet, daß das durchlöcherte Element (11) aus einem organischen polymeren Werkstoff besteht.

11. Matte nach einem der Ansprüche 1 bis 10, dadurch gekennzeichnet, daß der Rücken (13) aus einem

geschlossenen Werkstoff besteht.

12. Matte nach einem der Ansprüche 1 bis 11, dadurch gekennzeichnet, daß das durchlöcherte Element (11) so flexibel und elastisch ist, daß seine obere Fläche bei ihrem Begehen gegenüber dem Rücken (13) abwärts auslenkbar ist.

13. Matte nach Anspruch 12, dadurch gekennzeichnet, daß die Länge der Borsten (14) kleiner ist als die Dicke des durchlöcherten Elements (11) und daß das durchlöcherte Element so biegsam und elastisch ist, daß im Gebrauch die begangenen Flächen der Matte so weit elastisch abwärts ausgelenkt werden, daß die Borsten (14) die Schuhe oder Füße der begehenden Person berühren können.


16
15
12
11
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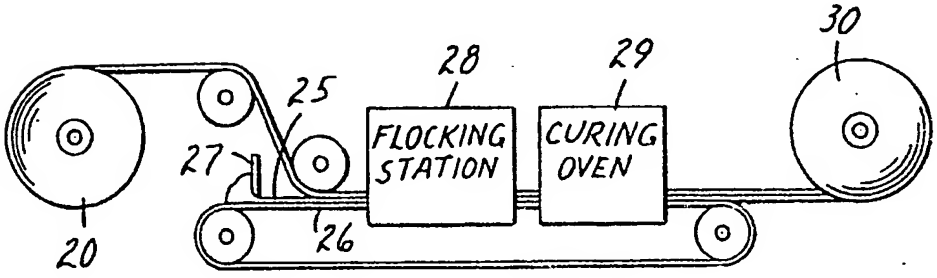
17
13

FIG. 1


30
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FLOCKING STATION
CURING OVEN
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26

FIG. 2

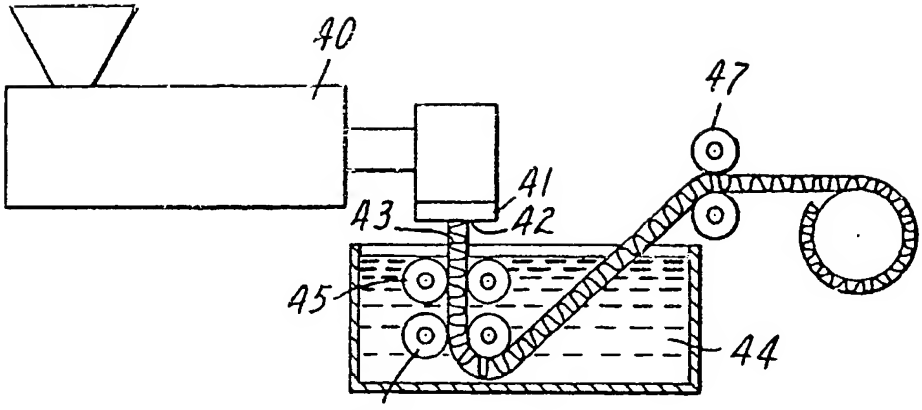

FIG. 3

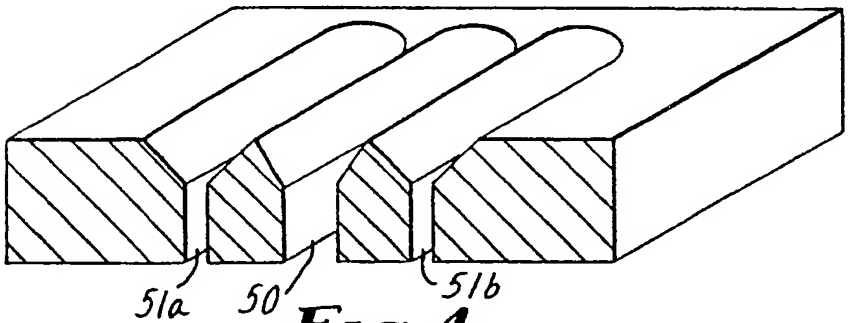

FIG. 4

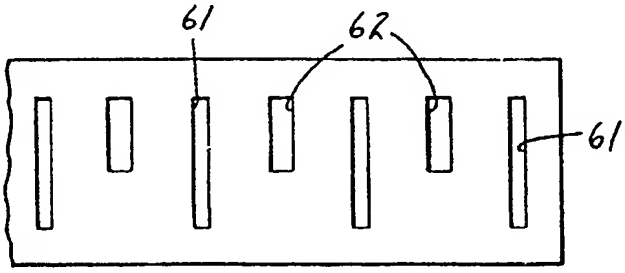

FIG. 5